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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/622,484

07/21/2003

Michael Setton

015290-755

4980

7590

12/15/2004

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EXAMINER

POMPEY, RON EVERETT

ART UNIT

PAPER NUMBER

2812

DATE MAILED: 12/15/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/622,484

Applicant(s)

SETTON, MICHAEL

Examiner

Ron E Pompey

Art Unit

2812

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 38-49 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 40-43 is/are allowed.
- 6) ☐ Claim(s) 38,39 and 44-49 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

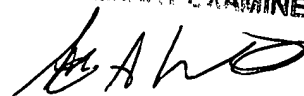
- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

STACY A. WHITMORE
PRIMARY EXAMINER



Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 2/17/09
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 38-39 and 44-48 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (US 5,880,508) in view of admitted prior art or Ohiwa et al.(4,947,081)..

Wu discloses the steps of:

For claim 38-39 and 44-48:

forming an interfacial layer (6, fig. 1), comprising silicon nitride or silicon oxynitride, on a silicon semiconductor substrate; and

forming a high dielectric constant layer (8, fig. 1) on the interfacial layer

forming a gate electrode of an electrically conductive material on the high dielectric constant layer; and

forming source and drain regions that are adjacent the gate electrode.

(col. 2, Ins. 63-67 and col. 3, Ins. 1-22; col.).

Wu, fails to disclose the limitations of: wherein the high dielectric layer comprises one of the following, $Ta_2(O_{1-x}N_x)_5$ and to having a gate width of less than 0.3 micron. However the admitted prior art, on page 6, line 24 –26, or Ohiwa , column 2, lines 45-58, discloses that a high dielectric layer can be formed of the above compositions.

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Also, in applicants' specification, page 7, line 25 – page 8, line 3, states that it is conventional for photoresist/lithography techniques to form a gate pattern that will form the line width of a gate less than 0.3 micron.

Therefore it would have been obvious to one of ordinary skill in the art to combine the admitted prior art (APA) and/or Ohiwa with Wu, because the above listed materials are art equivalent high dielectric material with Ta_2O_5 of the Wu reference and that since Wu is not explicit on the size of the pattern used to form the gate the APA gives typical sizes when forming a gate electrode in the semiconductor art.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 38-39 and 45-47 and 49 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The examiner is not sure whether the chemical formula for the TaON, is stoichiometrically accurate. Ta is in the +5 state so the formula requires one O (-2) and one N (-3) to balance the +5. Having 2 Ta atoms per molecule, there is +10 that has to be balanced, which cannot be done with the ON as presently written. From the statement " $Ta_2(O_{1-x}N_x)_5$ wherein x ranges from greater than 0 to 0.6" the examiner is trying to figure out whether the applicant is trying to claim that the nitrogen portion of oxygen PLUS nitrogen, or of the oxynitride is in a range less than 0 and up to 60% nitrogen or what.

Claim Objections

5. Claim 48 objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Independent claim 44 recites "forming a silicon nitride interfacial layer on a semiconductor substrate;" then claim 48 states "The method of Claim 44 wherein the interfacial layer comprises silicon oxide, silicon nitride, or silicon oxynitride. Which makes the dependent claim not further limiting of the independent claim.

Allowable Subject Matter

6. Claims 40-43 are allowed.

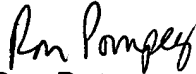
7. The following is a statement of reasons for the indication of allowable subject matter: the prior art of record, either singly or in combination, fails to disclose the limitations of: wherein the high dielectric layer comprises one of the following compositions, a solid solution of $(\text{Ta}_2\text{O}_5)_t - (\text{ZrO}_2)_{1-t}$, a solid solution of $(\text{Ta}_2\text{O}_5)_u - (\text{HfO}_2)_{1-u}$ wherein t and u range from about .09 to less than 1.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ron E Pompey whose telephone number is (571) 272-1680.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John Niebling can be reached on (571) 272-1679. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Ron Pompey
AU: 2812
December 12, 2004

STACY A. WHITMORE
PRIMARY EXAMINER

